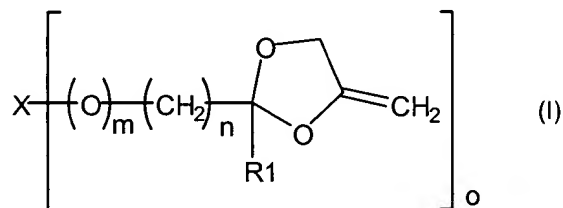


**AMENDMENTS TO THE CLAIMS:**

This listing of claims includes the claim amendments to claims 1-17 as shown in the amendment filed on January 5, 2004, new claims 18-25 as added by this Supplemental Amendment and will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

**Claim 1 (Currently Amended):** A 4-methylene-1,3-dioxolane compound of the general formula (I):



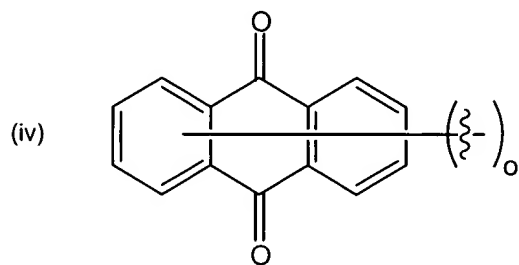
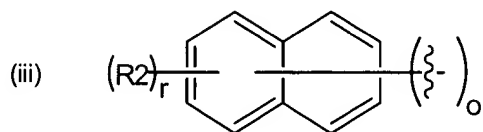
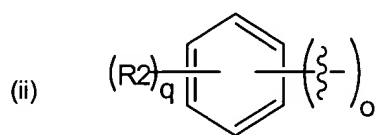
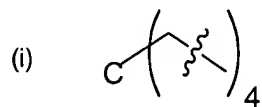
wherein R1 denotes hydrogen, C<sub>5</sub>-C<sub>6</sub>-cycloalkyl or C<sub>1</sub>-C<sub>4</sub>-alkyl; m and n, which may be the same or different, denote 0 or 1, wherein m ≤ n, o denotes 2, 3 or 4 depending on the valency of the group X; and X denotes a C-C single bond, straight-chain when said m denotes 1, or branched C<sub>1</sub>-C<sub>18</sub>-alkylene, C<sub>5</sub>-C<sub>6</sub>-cycloalkylene, C<sub>8</sub>-C<sub>18</sub>-arylalkylene, -CH<sub>2</sub>(OCH<sub>2</sub>CH<sub>2</sub>)<sub>p</sub>OCH<sub>2</sub>-, -

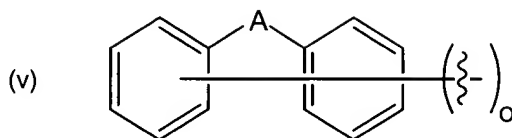
U.S. Patent Application Serial No. **09/934,655**

Response dated February 20, 2004

Reply to OA of **September 5, 2003**

$\text{CH}_2(\text{OCH}(\text{CH}_3)\text{CH}_2)_p\text{OCH}_2-$ , wherein  $p$  is an integer from 0 to 100, or a group selected from





wherein  $q \leq (6-o)$ ,  $r \leq (8-o)$ ,  $R_2$  denotes H or a  $C_1$ - $C_4$ -alkyl group and A denotes a single bond or denotes  $-C(CH_3)_2-$ ,  $-C(CF_3)_2-$ ,  $-CH_2-$ ,  $-SO_2-$  or  $-(C=O)-$ , and wherein the 2-position of the 1,3-dioxolane ring is not linked directly to an aromatic group.

**Claim 2 (Currently amended):** The A 4-methylene-1,3-dioxolane compound according to ~~claim 1~~, selected from the group consisting of:

- 1,3-Bis-(4-methylene-1,3-dioxolane-2-yl)propane,
- 1,2-bis-(2-methyl-4-methylene-1,3-dioxolane-2-yl)ethane,
- 2,2'-bis-[4-methylene oxyphenyl-(4-methylene-1,3-dioxolane-2-yl)]propane,
- bis-(4-methylene-1,3-dioxolane-2-yl)methane,
- 1,5-bis-(4-methylene-1,3-dioxolane-2-yl)pentane,
- 1,6-bis-(4-methylene-1,3-dioxolane-2-yl)hexane,
- bis-(4-methylene-1,3-dioxolane-2-yl)methylether,
- 1,3-bis-[(4-methylene-1,3-dioxolane-2-yl)methylene oxy]propane,
- tetrakis-[(4-methylene-1,3-dioxolane-2-yl)methylene oxy]neopentane,
- 1,4-bis-(4-methylene-1,3-dioxolane-2-yl)cyclohexane,

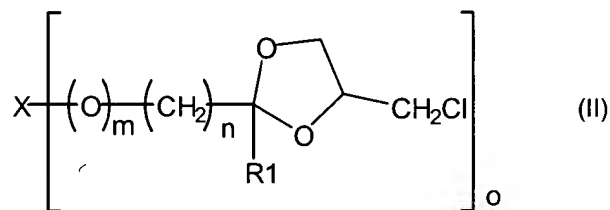
U.S. Patent Application Serial No. 09/934,655

Response dated February 20, 2004

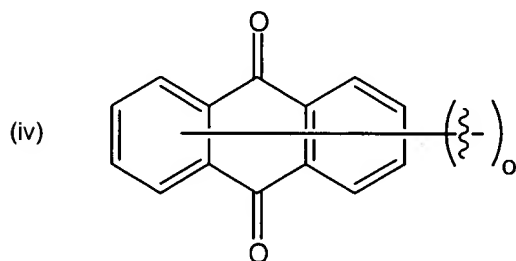
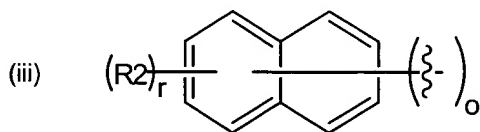
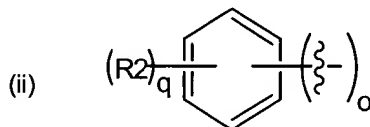
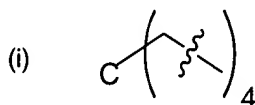
Reply to OA of September 5, 2003

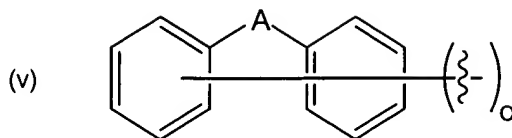
1,2-bis-[(4-methylene-1,3-dioxolane-2-yl)methylene oxy]ethane,  
2,2'-bis-[(4-methylene-1,3-dioxolane-2-yl)methylene oxy]ethylether,  
1,4-bis-[(4-methylene-1,3-dioxolane-2-yl)ethenyl]benzene,  
1,3-bis-[(4-methylene-1,3-dioxolane-2-yl)methylene oxy]benzene,  
1,5-bis-[(4-methylene-1,3-dioxolane-2-yl)methylene oxy]naphthalene,  
2,2-bis-[4-(4-methylene-1,3-dioxolane-2-yl)methylene oxyphenyl]propane,  
bis-[4-(4-methylene-1,3-dioxolane-2-yl)methylene oxyphenyl]methane,  
4,4'-bis-[(4-methylene-1,3-dioxolane-2-yl)methylene oxy]biphenyl,  
2,6-bis-[(4-methylene-1,3-dioxolane-2-yl)methylene oxy]anthraquinone, and  
1,3,5-tris-[(4-methylene-1,3-dioxolane-2-yl)methylene oxy]benzene.

**Claim 3 (Withdrawn):** A 4-chloromethyl-1,3-dioxolane compound of the general formula (II):



wherein R1, m, n, o and X have the same meanings as those defined for general formula (I) in claim 1, respectively denotes hydrogen, C<sub>5</sub>-C<sub>6</sub>-cycloalkyl or C<sub>1</sub>-C<sub>4</sub>-alkyl; m and n, which may be the same or different, denote 0 or 1, wherein m ≤ n, o denotes 2, 3 or 4 depending on the valency of the group X; and X denotes a C-C single bond, straight-chain, or branched C<sub>1</sub>-C<sub>18</sub>-alkylene, C<sub>5</sub>-C<sub>6</sub>-cycloalkylene, C<sub>8</sub>-C<sub>18</sub>-arylalkylene, -CH<sub>2</sub>(OCH<sub>2</sub>CH<sub>2</sub>)<sub>p</sub>OCH<sub>2</sub>-, -CH<sub>2</sub>(OCH(CH<sub>3</sub>)CH<sub>2</sub>)<sub>p</sub>OCH<sub>2</sub>-, wherein p is an integer from 0 to 100, or a group selected from





wherein  $q \leq (6-o)$ ,  $r \leq (8-o)$ , R2 denotes H or a C<sub>1</sub>-C<sub>4</sub>-alkyl group and A denotes a single bond or denotes -C(CH<sub>3</sub>)<sub>2</sub>-, -C(CF<sub>3</sub>)<sub>2</sub>-, -CH<sub>2</sub>-, -SO<sub>2</sub>- or -(C=O)-, and wherein the 2-position of the 1,3-dioxolane ring is not linked directly to an aromatic group.

**Claim 4 (Withdrawn):** The 4-chloromethyl-1,3-dioxolane according to claim 3, selected from the group consisting of:

- 1,3-bis-(4-chloromethyl-1,3-dioxolane-2-yl)propane,
- 1,2-bis-(2-methyl-4-chloromethyl-1,3-dioxolane-2-yl)ethane,
- 2,2'-bis-[4-methylene oxyphenyl-(4-chloromethyl-1,3-dioxolane-2-yl)]propane,
- bis-(4-chloromethyl-1,3-dioxolane-2-yl)methane,
- 1,5-bis-(4-chloromethyl-1,3-dioxolane-2-yl)pentane,
- 1,6-bis-(4-chloromethyl-1,3-dioxolane-2-yl)hexane,
- bis-(4-methylene-1,3-dioxolane-2-yl)methylether,
- 1,3-bis-[(4-chloromethyl-1,3-dioxolane-2-yl)methylene oxy]propane,
- tetrakis-[(4-chloromethyl-1,3-dioxolane-2-yl)methylene oxy]neopentane,
- 1,4-bis-(4-chloromethyl-1,3-dioxolane-2-yl)cyclohexane,
- 1,2-bis-[(4-chloromethyl-1,3-dioxolane-2-yl)methylene oxy]ethane,

U.S. Patent Application Serial No. 09/934,655

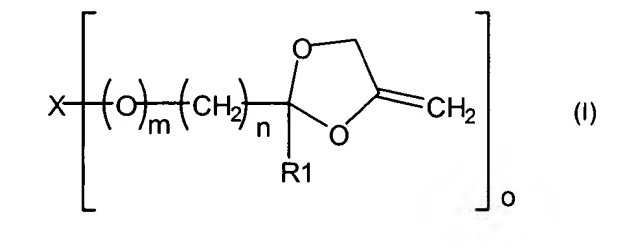
Response dated February 20, 2004

Reply to OA of September 5, 2003

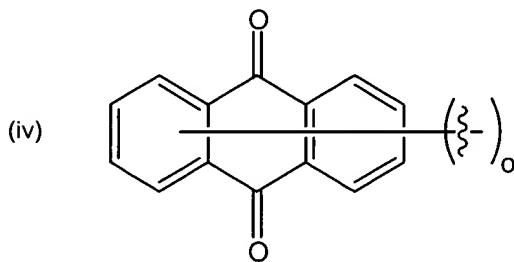
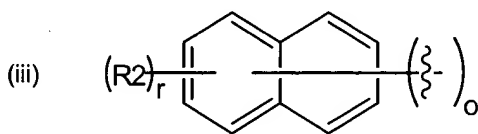
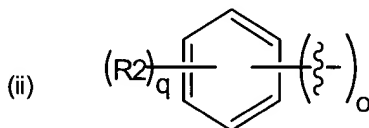
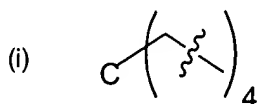
2,2'-bis-[(4-methylene-1,3-dioxolane-2-yl)methylene oxy]ethylether,  
1,4-bis-[(4-chloromethyl-1,3-dioxolane-2-yl)ethenyl]benzene,  
1,3-bis-[(4-chloromethyl-1,3-dioxolane-2-yl)methylene oxy]benzene,  
1,5-bis-[(4-chloromethyl-1,3-dioxolane-2-yl)methylene oxy]naphthalene,  
2,2-bis-[4-(4-chloromethyl-1,3-dioxolane-2-yl)methylene oxyphenyl]propane,  
bis-[4-(4-chloromethyl-1,3-dioxolane-2-yl)methylene oxyphenyl]methane,  
4,4'-bis-[(4-chloromethyl-1,3-dioxolane-2-yl)methylene oxy]biphenyl,  
2,6-bis-[(4-chloromethyl-1,3-dioxolane-2-yl)methylene oxy]anthraquinone, and  
1,3,5-tris-[(4-chloromethyl-1,3-dioxolane-2-yl)methylene oxy]benzene.

**Claim 5 (Canceled)**

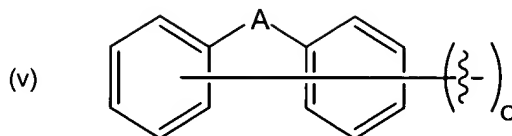
**Claim 6 (Currently amended):** ~~The process according to claim 5;~~ A process for the production of a 4-methylene-1,3-dioxolane compound of the general formula (I):



wherein R1 denotes hydrogen, C<sub>5</sub>-C<sub>6</sub>-cycloalkyl or C<sub>1</sub>-C<sub>4</sub>-alkyl; m and n, which may be the same or different, denote 0 or 1, wherein m ≤ n, o denotes 2, 3 or 4 depending on the valency of the group X; and X denotes a C-C single bond, straight-chain or branched C<sub>1</sub>-C<sub>18</sub>-alkylene, C<sub>5</sub>-C<sub>6</sub>-cycloalkylene, C<sub>8</sub>-C<sub>18</sub>-arylalkylene, -CH<sub>2</sub>(OCH<sub>2</sub>CH<sub>2</sub>)<sub>p</sub>OCH<sub>2</sub>-, -CH<sub>2</sub>(OCH(CH<sub>3</sub>)CH<sub>2</sub>)<sub>p</sub>OCH<sub>2</sub>-, wherein p is an integer from 0 to 100, or a group selected from



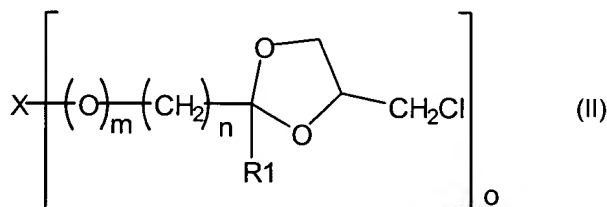




wherein  $q \leq (6-o)$ ,  $r \leq (8-o)$ , R2 denotes H or a C<sub>1</sub>-C<sub>4</sub>-alkyl group and A denotes a single bond or denotes -C(CH<sub>3</sub>)<sub>2</sub>-, -C(CF<sub>3</sub>)<sub>2</sub>-, -CH<sub>2</sub>-, -SO<sub>2</sub>- or -(C=O)-, and wherein the 2-position of the 1,3-dioxolane ring is not linked directly to an aromatic group.

the process comprising the steps of:

treating a 4-chloromethyl-1,3-dioxolane compound of the general formula (II):



wherein R1, m, n, o and X have the same meaning, respectively, as those defined for general formula (I) above,

with a base at a temperature from 0°C to 150°C to obtain a reaction product; and

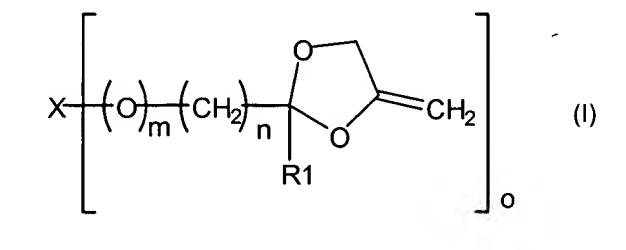
isolating the reaction product in accordance with a *per se* known process

wherein the process it is implemented at a temperature from 15°C to 60°C.

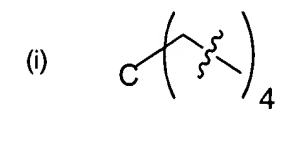
**Claim 7 (Currently Amended):** The process according to claim [[5]] 6, wherein the treatment is implemented in the presence of a solvent.

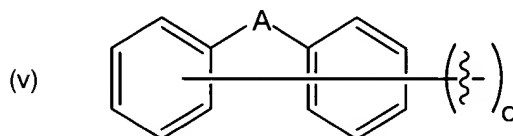
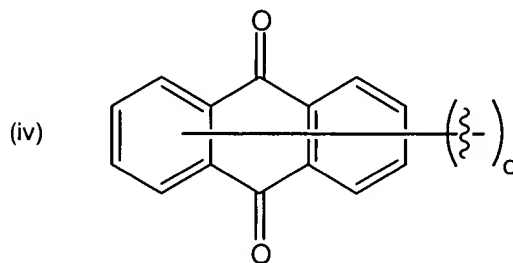
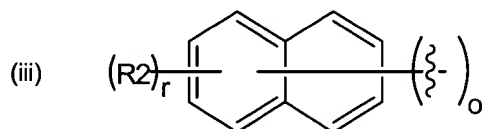
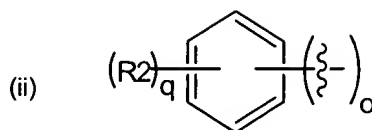
**Claim 8 (Original):** The process according to claim 7, wherein the solvent is a good solvent for the base.

**Claim 9 (Currently amended):** ~~The process according to one of claims 5 to 8~~ A process for the production of a 4-methylene-1,3-dioxolane compound of the general formula (I):



wherein R1 denotes hydrogen, C<sub>5</sub>-C<sub>6</sub>-cycloalkyl or C<sub>1</sub>-C<sub>4</sub>-alkyl; m and n, which may be the same or different, denote 0 or 1, wherein m ≤ n, o denotes 2, 3 or 4 depending on the valency of the group X; and X denotes a C-C single bond, straight-chain or branched C<sub>1</sub>-C<sub>18</sub>-alkylene, C<sub>5</sub>-C<sub>6</sub>-cycloalkylene, C<sub>8</sub>-C<sub>18</sub>-arylalkylene, -CH<sub>2</sub>(OCH<sub>2</sub>CH<sub>2</sub>)<sub>p</sub>OCH<sub>2</sub>-, -CH<sub>2</sub>(OCH(CH<sub>3</sub>)CH<sub>2</sub>)<sub>p</sub>OCH<sub>2</sub>-, wherein p is an integer from 0 to 100, or a group selected from

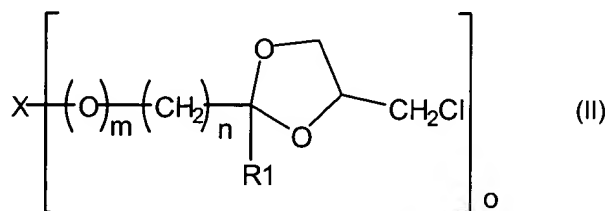




wherein  $q \leq (6-o)$ ,  $r \leq (8-o)$ , R2 denotes H or a C<sub>1</sub>-C<sub>4</sub>-alkyl group and A denotes a single bond or denotes -C(CH<sub>3</sub>)<sub>2</sub>-, -C(CF<sub>3</sub>)<sub>2</sub>-, -CH<sub>2</sub>-, -SO<sub>2</sub>- or -(C=O)-, and wherein the 2-position of the 1,3-dioxolane ring is not linked directly to an aromatic group,

the process comprising the steps of:

treating a 4-chloromethyl-1,3-dioxolane compound of the general formula (II):



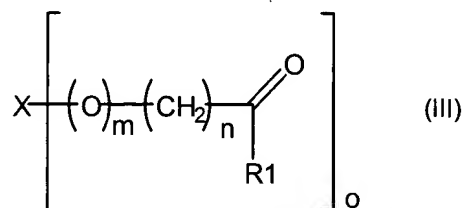
wherein R1, m, n, o and X have the same meaning, respectively, as those defined for general formula (I) above,

with a base at a temperature from 0°C to 150°C to obtain a reaction product; and

isolating the reaction product in accordance with a *per se* known process, wherein the base is potassium-*tert.*-butylate.

**Claim 10 (Withdrawn):** A process for the production of a 4-chloromethyl-1,3-dioxolane compound as recited in claim 3, comprising the steps of:

reacting a compound of the general formula (III):



U.S. Patent Application Serial No. 09/934,655  
Response dated February 20, 2004  
Reply to OA of September 5, 2003

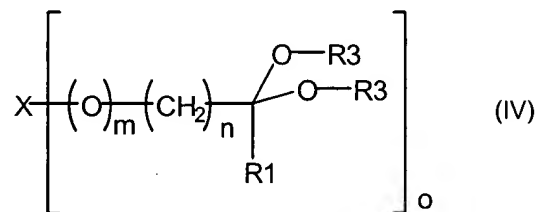
wherein R1, m, n, o and X have the same meanings as those defined for general formula (II) in claim 3, respectively, with 3-chloro-1,2-propanediol; and  
removing the resulting reaction water by distillation.

**Claim 11 (Withdrawn):** The process according to claim 10, wherein it is carried out in the presence of a catalyst.

**Claim 12 (Withdrawn):** The process according to claim 10 or 11, wherein an entrainer is used.

**Claim 13 (Withdrawn):** A process for the production of a 4-chloromethyl-1,3-dioxolanes as recited in claim 3, comprising the steps of:

treating an acetal of the general formula (IV):



U.S. Patent Application Serial No. 09/934,655

Response dated February 20, 2004

Reply to OA of September 5, 2003

wherein R1, m, n, o and X have the same meanings as those defined for general formula (II) in claim 3, respectively, and R3 denotes a methyl or ethyl group, with 3-chloro-1,2-propanediol in the presence of an acidic catalyst at a temperature from 25°C to 150°C; and

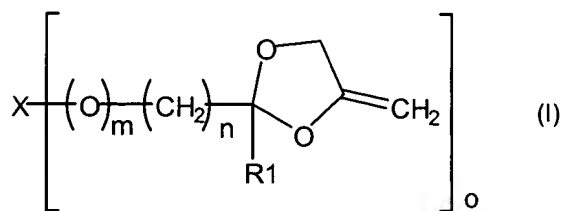
removing the resulting alcohol by distillation.

**Claim 14 (Withdrawn):** A composition capable of emission-free, photocationic cross-linking comprising at least one 4-methylene-1,3-dioxolane compound according to claim 1 and at least one photo-initiator.

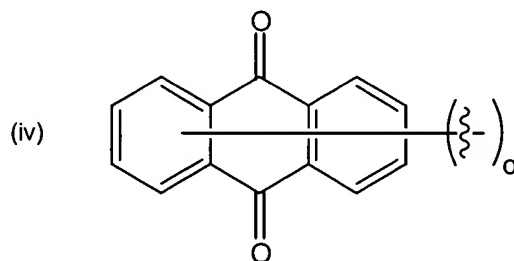
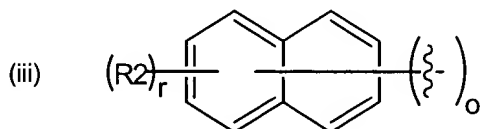
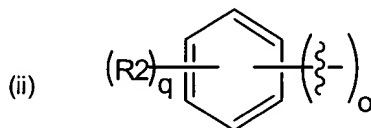
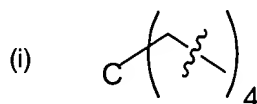
**Claim 15 (Withdrawn):** The composition according to claim 14, wherein the photo-initiator comprises a triaryl sulfonium salt or a diaryl iodonium salt.

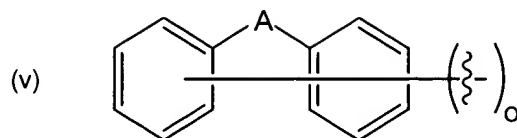
**Claim 16 (Withdrawn):** A transparent film obtained from a composition according to claim 14 or 15.

**Claim 17 (New):** A 4-methylene-1,3-dioxolane compound of the general formula (I):



wherein R1 denotes hydrogen, C<sub>5</sub>-C<sub>6</sub>-cycloalkyl or C<sub>1</sub>-C<sub>4</sub>-alkyl; m and n, which may be the same or different, denote 0 or 1, wherein m ≤ n, o denotes 2, 3 or 4 depending on the valency of the group X; and X denotes a C-C single bond, straight-chain or branched C<sub>1</sub>-C<sub>18</sub>-alkylene, C<sub>5</sub>-C<sub>6</sub>-cycloalkylene, C<sub>8</sub>-C<sub>18</sub>-arylalkylene, -CH<sub>2</sub>(OCH<sub>2</sub>CH<sub>2</sub>)<sub>p</sub>OCH<sub>2</sub>-, -CH<sub>2</sub>(OCH(CH<sub>3</sub>)CH<sub>2</sub>)<sub>p</sub>OCH<sub>2</sub>-, wherein p is an integer from 0 to 100, or a group selected from





wherein  $q \leq (6-o)$ ,  $r \leq (8-o)$ ,  $R_2$  denotes H or a  $C_1$ - $C_4$ -alkyl group and A denotes a single bond or denotes  $-C(CH_3)_2-$ ,  $-C(CF_3)_2-$ ,  $-CH_2-$ ,  $-SO_2-$  or  $-(C=O)-$ , and wherein the 2-position of the 1,3-dioxolane ring is not linked directly to an aromatic group.

**Claim 18 (New):** The 4-methylene-1,3-dioxolane compound according to claim 1, being 2,2'-oxybismethylene-bis-(4-methylene-1,3-dioxolane).

**Claim 19 (New):** The 4-chloromethyl-1,3-dioxolane compound according to claim 3, being 2,2'-oxybismethylene-bis-(4-chloromethyl-1,3-dioxolane).

**Claim 20 (New):** The 4-methylene-1,3-dioxolane compound according to claim 1, being the product of the reaction of diglycolaldehyde and 3-chloro-1,2-propandiol.

**Claim 21 (New):** The 4-chloromethyl-1,3-dioxolane compound according to claim 3, being the isolated product of the reaction of diglycolaldehyde and 3-chloro-1,2-propandiol treated with a base at temperatures  $0^\circ\text{C}$  and  $150^\circ\text{C}$ .



U.S. Patent Application Serial No. 09/934,655  
Response dated February 20, 2004  
Reply to OA of September 5, 2003

**Claim 22 (New):** The 4-methylene-1,3-dioxolane compound according to claim 1, being 2,2'-oxybis(ethyleneoxymethylene)-bis-(4-methylene-1,3-dioxolane).

**Claim 23 (New):** The 4-chloromethyl-1,3-dioxolane compound according to claim 3, being 2,2'-oxybis(ethyleneoxymethylene)-bis-(4-chloromethyl-1,3-dioxolane).

**Claim 24 (New):** The 4-methylene-1,3-dioxolane compound according to claim 1, made by the steps of synthesizing an acetal compound by reacting a compound selected from the group consisting of chloroacetaldehyde dimethylacetal, bromoacetaldehyde dimethylacetal, chloroacetaldehyde diethylacetal and bromoacetaldehyde diethylacetal with diethylene glycol to form a resulting acetal compound followed by reacting said resulting acetal compound with 3-chloro-1,2-propandiol.

**Claim 25 (New):** The 4-chloromethyl-1,3-dioxolane compound according to claim 3, made by the steps of synthesizing an acetal compound by reacting a compound selected from the group consisting of chloroacetaldehyde dimethylacetal, bromoacetaldehyde dimethylacetal, chloroacetaldehyde diethylacetal and bromoacetaldehyde diethylacetal with diethylene glycol to form a resulting acetal compound followed by reacting said resulting acetal compound with 3-

U.S. Patent Application Serial No. **09/934,655**  
Response dated February 20, 2004  
Reply to OA of **September 5, 2003**

chloro-1,2-propandiol to form a resulting product, treating the product with a base at temperatures between 0°C and 150°C and isolating treated product.